We Claim:

1. An assay device comprising: a frame having a number of wells, each defined by at least a sidewall; a planar substrate having a surface with a number of first and second areas; said first areas each having a porous layer and said second areas being without such a porous layer; said first and second areas are adjacent to each other, and said second areas, as part of an understructure, serves as a support for each of said porous layers; wherein said frame and planar substrate are joined together forming a multi-well plate, in which each first area forms part of a bottom surface of said wells

2. The device according to claim 1, wherein said porous layer is characterized as having a plurality of interconnected voids of a predetermined mean size of not less than about 0.05 μm dispersed therethrough, and said voids are defined by a network of contiguous solid material, creating a three-dimensional structure having a porosity of up to about 99.7%.

3. The device according to claim 1, wherein said solid material and contents of said voids exhibit a high contrast in their indices of refraction relative to each other.

4. The device according to claim 1, wherein said porous layer is formed of a kind of material having a granular morphology.

5. The device according to claim 4, wherein said material is a frit-based material or polymeric material having interconnected channels.

6. The device according to claim 5, wherein said porous layer is either a) unmodified or b) modified with a surface chemistry that enhances the attachment of biological species to the porous layer.

7. The device according to claim 6, wherein when said porous layer is an unmodified, bare surface, said porous layer is adapted to physically ensnare probe molecules with said voids of said porous matrix.

8. The device according to claim 6, wherein said surface chemistry is selected from a silane, a polymer, or a biological coating.

9. The device according to claim 8, wherein said silane coating is selected from the group consisting of: 3-acyloxypropyl-trimethoxysilane, allyltrichlorosilane, 3-aminpropyltriethoxysilane, N-(6-aminohexyl)aminopropyl-trimethoxysilane, bis(triethoxysilye)methane, 2-(3-cyclohexenyl)ethyl)triethoxysilane, 3-glycidoxypropyl-trimethoxysilane.

10. The device according to claim 8, wherein said polymer coating is selected from the group consisting of: chitosan, epoxy-presenting polymers, an anhydride-presenting polymer, NHS-ester-presenting polymer, aldehyde-presenting polymer, poly-ethylene-amine, or poly-lysine.

11. The device according to claim 8, wherein said biological coating is selected from the group consisting of: antibodies, protein-A, protein-G, lectin, wheat-germ-agglutinin.

12. The device according to claim 1, wherein said frame is joined to said planar substrate at a number of said second areas.

13. The device according to claim 1, wherein said frame is joined to said substrate support by means of at least one of the following techniques: thermal-welding, sonic-welding, infrared-welding, or chemical adhesive.

14. The device according to claim 1, wherein said frame is composed of either a glass or a polymer, or combination of both materials.

15. A method for manufacturing a microplate, the method comprises: providing a support of glass; providing a kind of material having a granular morphology; depositing the granular material onto said support to form a defined area of granular material; adhering individual particles of said granular material together to form a porous layer of interconnected voids attached to said support; providing a frame having a number of

wells, each defined by at least a sidewall; assembling said frame with said support to construct a microplate.

16. A method of making a substrate used in a microplate, the method comprises the following steps: providing a template for forming a number of porous patches; providing a flat, rigid, non-porous understructure; applying within said template a layer of material with granular particles to a top surface of the inorganic understructure.

17. The method according to claim 16, wherein said template serves as an adaptor that defines the location of each porous patch so as to correspond with an arrangement of wells in said microplate.

18. The method according to claim 16, wherein said granular particles are consolidated to form a porous wafer attached to said understructure.

19. A method for manufacturing a support plate, the method comprises: providing an organic or polymeric layer formed from individual granular particles that are adhered together to form a porous matrix; placing said porous layer on a understructure support plate; attaching said porous layer to said understructure support plate by means of applying pressure and either (a) a thermal bond using a heated platen or adaptor with the configuration of a microplate, or (b) adhesive chemistry using a "stamp" adaptor with the same configurations of a microplate, wherein either approach (a) or (b) a section of the porous layer will be separated from other areas.

20. A method for manufacturing a microplate, the method comprises: providing an understructure support of either a non-porous glass or polymer material; providing a polymeric, granular material; depositing the granular material onto a surface of said support to form a defined area of granular material; binding said granular material together to form a porous layer of interconnected voids attached to said support; providing a frame having a number of wells; assembling said frame with said support.

21. A method of using a microplate, the method comprises: providing a microplate having a number of wells, each of said wells having a three-dimensional porous-matrix located therein as a porous layer, said porous layer being either modified or unmodified with a predetermined surface chemistry for immobilizing probe species; depositing biological probes at a number of defined locations on said porous layer; and performing a bioassay with a sample.

22. The method according to claim 21, further comprising entrapping a portion of said probes in a portion of voids within said porous matrix when said porous layer is an unmodified, bare substrate.

23. The method according to claim 21, wherein said probes are deposited either as an array of a number of microspots or as a single spot with a diameter of $\geq$ 100 μm.

24. The method according to claim 21, wherein said probes are selected from the group consisting of nucleic acids, membrane-proteins, proteins, carbohydrates, lipids, or chemical molecules.

25. The method according to claim 21, wherein said membrane-proteins are selected from GPCRs, ion-channels, tyrosine kinase receptors, immuno-receptors, and transporters.

26. The method according to claim 21, wherein when said probes are membrane proteins associated with lipid molecules, the porous substrate is uncoated with a material that modifies surface properties of said porous substrate.

27. The method according to claim 21, wherein the biological membrane is selected from any one of the following: a cell-membrane fragment preparation, a lipid vesicle containing reconstituted membrane-protein, or a lipid micelle containing a membrane-protein, an exosome vesicle particle containing at least a membrane-protein of interest.